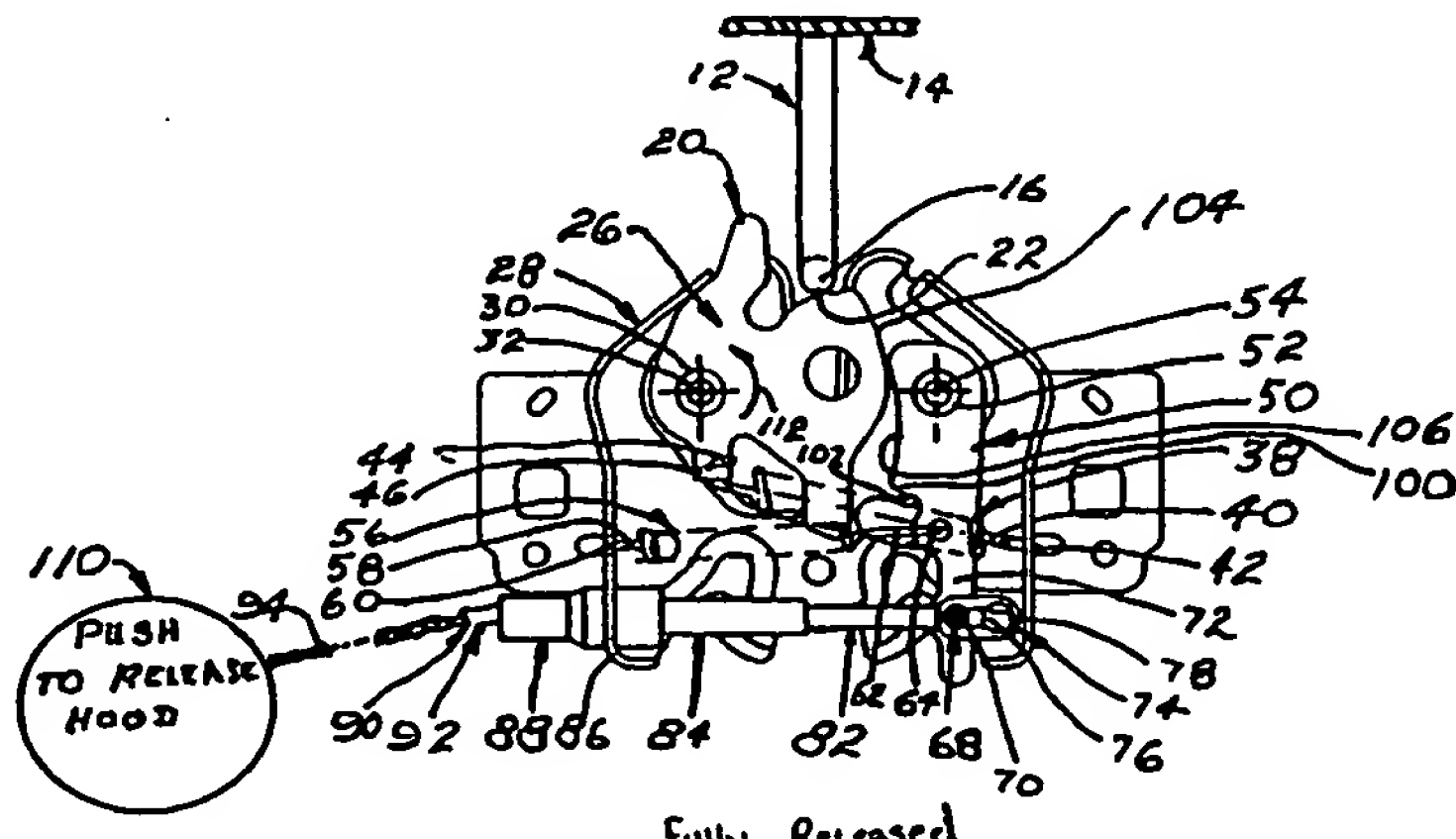




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(21) International Application Number: PCT/US98/00319 (22) International Filing Date: 15 January 1998 (15.01.98) (30) Priority Data: 60/035,585 17 January 1997 (17.01.97) US Not furnished 15 January 1998 (15.01.98) US (71) Applicant (for all designated States except US): DURA AUTOMOTIVE SYSTEMS, INC. [US/US]; 2791 Research Drive, Rochester Hills, MI 48309-3575 (US). (71)(72) Applicant and Inventor: KOENIG, Peter, C. [US/US]; 635 Homestead Drive, Moberly, MO 65270 (US). (74) Agent: BOYER, Michael, Kevin; Orscheln Management Co., 2000 US. Highway 63 South, Moberly, MO 65270 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: HOOD LATCH AND RELEASE MECHANISM AND OPERATING SYSTEM INCLUDING SAME  (57) Abstract <p>A vehicle hood latch and release mechanism (10) is latched when the hood striker (12) engages the latch portion of the mechanism (10) as the hood (14) is moved to its closed position. The mechanism (10) is actuated to release the hood striker (12) by a pushing action on the cable (94) or strand movable in the sheath (90) of a cable assembly (92) rather than by the typical pulling action on current hood releasing mechanisms. The pushing action is obtained with actuation of a hood latching and releasing control (110), by movement of a handle (202) which operatively pushes on the cable (94) or strand, transmitting a longitudinally compressive force rather than a longitudinally tensional force to the latch mechanism (10) and moving that mechanism to the striker-released position. Release of the control permits one or more springs (56, 250) to cause the control handle (202) to be returned to its position wherein the latching and release mechanism (10) is ready to again be latched to the hood striker (12). The handle (202) is also in this position when the latching mode of the hood latching and releasing mechanism (10) latches the hood striker (12) to hold the hood (14) closed. Modifications (300) of the hood latching and releasing control (110) are disclosed.</p>		

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HOOD LATCH AND RELEASE MECHANISM
AND OPERATING SYSTEM INCLUDING SAME

CROSS-REFERENCE TO RELATED APPLICATION

5 Claim of priority and benefit of earlier filing date:

 The inventor of this United States Patent Application
filed under 35 U.S.C. 111(a) hereby claims priority of
invention and the benefit of the earlier filing date in the
United States under 35 U.S.C. 119(e) and 35 U.S.C. 120 for
10 the invention disclosed herein in the manner provided by the
first paragraph of 35 U.S.C. 112, that claim of priority and
benefit of earlier filing date being based on the disclosure
of United States Provisional Application Serial No.
60/035,585 filed January 17, 1997, by the applicant Peter C.
15 Koenig, Moberly, MO, who is the inventor named in this United
States Patent Application as the inventor of the invention
herein disclosed and claimed. The above-identified
Provisional Application was also assigned to the same
assignee as the assignee of the invention disclosed and
20 claimed herein. The above-identified Provisional Application
fully complies with 35 U.S.C. 119(e) (2).

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

25 The invention relates to an improved hood latch and
release mechanism and related apparatus for operating the
mechanism which together provide an improved hood latch and
release system.

DESCRIPTION OF THE RELATED ART

Hood latch and release mechanisms (hereinafter referred to as hood latches or hood latch mechanisms) are employed conventionally in automobiles, trucks, tractor-trailers, among other apparatus for securing one or more compartments. Conventional hood latches are widely used in automobiles and trucks to maintain the hood in a closed position as well as to provide security for the engine compartment. These hood latches can be released by pulling a lever or rod within the passenger compartment that in turn releases the latch, thereby permitting the hood to be opened. The lever or rod is functionally connected to the hood latch by a cable assembly which comprises a sheath or conduit having a cable or strand which is longitudinally movable in the sheath under tension. Actuation of the lever or rod exerts a tension force through the cable, pulling on and actuating the latch release mechanism.

Conventional hood latch mechanisms can often be operated in an unintended manner by manually pulling on the cable assembly via access from underneath the vehicle or through the front grill of the vehicle, which in turn pulls the strand and releases the latch mechanism. Such unintended release operation of the hood latch unfortunately allows unauthorized access to the engine and its components as well as several other components of the vehicle, presenting the opportunity for theft and vandalism. Consequently, there is a need in this art for an improved hood latch mechanism which eliminates unauthorized access to the engine compartment and theft of vehicle components or the entire vehicle by

eliminating the ability to pull on the cable or strand so as to unlatch the hood latch mechanism.

BRIEF SUMMARY OF THE INVENTION

5 The invention herein disclosed and claimed solves problems associated with conventional hood latches and their release operating apparatus by providing an improved hood latch mechanism having a latch release system which is actuated by application of a compressive force. By pushing
10 the cable or strand into the latch, a release arm or lever is rotated about a pivot, thereby permitting movement of a striker latching bolt and resulting in withdrawal of the striker from the hood latch, releasing the latch.

15 BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is an side elevation view, with parts broken away and in section, from the perspective wherein the hood latch and release mechanism portion of the system is seen from a vantage point within the vehicle engine compartment normally covered by the engine compartment hood, with a cable
20 or strand schematically shown as being within a sheath or conduit and as being connected to the schematically shown release handle of the system. The latch mechanism is shown in the ready-to-latch or ready-to-engage position.

25 FIGURE 2 is a view similar to that of FIGURE 1 showing the latch mechanism in the fully engaged or fully locked position.

FIGURE 3 is a view similar to that of FIGURES 1 and 2 showing the latch mechanism in the fully released or open position.

FIGURE 3a is a schematic representation of the relationship of the vehicle hood and the hood latch and release mechanism of FIGURES 1-3 located in a vehicle, with the hood latch and release control of either FIGURES 4-6 or FIGURES 7-9.

FIGURE 4 is a cross section view, with parts broken away, showing one arrangement of the hood latch and release control, shown as a pivoting handle. It illustrates the handle end of the cable or strand with the latch mechanism being in the fully latched position of FIGURE 2. The release handle mechanism shown in this FIGURE 4 is also in this position when the hood latch mechanism is in the ready-to-engage position of FIGURE 1.

FIGURE 5 is a cross section view similar to that of FIGURE 4 showing the position of the hood latch and release control at the release handle end of the cable or strand with the hood latch mechanism in the released position shown in FIGURE 3.

FIGURE 5a is an enlarged portion of the control of FIGURES 5-7, shown with portions of the control in the position also illustrated in FIGURE 5a and encircled with the dashed circle labeled 5a. Parts are broken away and in section.

FIGURE 6 is a cross section view similar to that of FIGURE 5 showing the maximum stroke of the push-to-release action of the hood latch and release control at the release

handle end of the cable or strand with the hood latch mechanism in the released position shown in FIGURE 3.

FIGURE 7 is a cross section view of another hood latch and release control at the release handle end of the cable or strand with the hood latch mechanism being in the fully latched position of FIGURE 2. The mechanism shown in this FIGURE 7 is also in this position when the hood latch mechanism is in the ready-to-engage position of FIGURE 1.

FIGURE 8 is a cross section view similar to that of FIGURE 7 showing the position of the hood latch and release control at the release handle end of the cable or strand with the hood latch mechanism in the released position shown in FIGURE 3.

FIGURE 9 is a cross section view similar to that of FIGURE 8 showing the maximum stroke of the push-to-release action of the hood latch and release control at the release handle end of the cable or strand with the hood latch mechanism in the released position shown in FIGURE 3.

DETAILED DESCRIPTION OF THE INVENTION

FIGURES 1 through 3 illustrate one aspect of the inventive latch mechanism. The latch mechanism 10 includes a striker 12 secured to the vehicle hood 14 and so positioned as to be moved in a substantially vertical portion of its arc of movement when the hood is raised or closed. Striker 12 is shown as a bar which may be either J-shaped with the longer end secured to the hood 14, or U-shaped with both ends secured to the hood 14. The bar may have various cross-section shapes, with a circular cross section being

illustrated. In the particular construction of the striker shown in FIGURES 2 and 3, the U-shaped version is shown. In either instance, the reverse-bent portion 16 of the striker, shown in cross section in FIGURE 1, is positioned to be able to have its inner (upper) surface 18 engaged by the latch mechanism bolt 20 in the latched position shown in FIGURE 2. The reverse-bent portion 16 of the striker is also positioned to be disengaged by the bolt 20 and permit its outer (lower) surface 22 to follow a cam-like surface 24 on another part of the arm 26, of which the bolt 20 is a part, as the latch mechanism is released at least to a position wherein the outer (lower) surface 22 of the striker reverse-bent portion 16 is resting on a part of the surface 24 until the hood is raised further, and also when the hood is gently lowered to the ready-to-latch position of FIGURE 1 but not moved downwardly sufficiently to cause the latch mechanism to be moved to its latched position. When the striker is in the released position, safety regulations require that a secondary latch be positioned to permit further opening of the vehicle hood until the secondary latch is separately actuated. Since this secondary latch mechanism and its release arrangement form no part of the present invention, they are not shown in the drawings.

The hood latch and release mechanism 10 includes a mounting bracket 28 which can be attached to a suitable part of the automotive assembly such as an automotive radiator support arm or bracket, not shown. The bolt latch and release arm 26 is pivotally mounted to bracket 28 by a suitable device such as a rivet, bolt or stud 30 which

provides a pivot axis 32 for the arm 26. The bolt 20 is formed as a section of arm 26. It is shaped somewhat like a finger and extends generally in a radial direction from the arm pivot axis 32. Its side surface 34 joins surface 24 via the arcuate recess surface 36. Surface 34 is the portion of the bolt 20 which selectively engages the inner (upper) surface 18 of the striker 12 to lock the striker in place as shown in FIGURE 2.

A tension spring 38 has one end 40 attached to the mounting bracket 28 at 42. The other spring end 44 is attached to a tang 46 formed on a portion of arm 26 that is substantially on the opposite side of axis 32 from bolt 20. Spring 38 continually urges the arm 26 toward rotation about axis 32 in a counter-clockwise direction as the arm is seen in FIGURES 1-3. Thus spring 38 is continually urging the bolt 20 toward its released but ready-to-latch position shown in FIGURES 3 and 1, respectively.

A bolt release lever 50 is pivotally mounted to bracket 28 by a suitable device such as a rivet, bolt or stud 52 which provides a pivot axis 54 for the lever 50. Another tension spring 56 has one of its ends 58 attached to a part of the mounting bracket 28 at 60 and its other end 62 attached to a part of lever 50 at attachment point 64. Attachment point 64 is spaced away from axis 52 so that the tension in spring 56 continually urges lever 50 to rotate in a clockwise direction as viewed in FIGURES 1-3.

The opposite end 66 of lever 50 from that lever's pivot axis 54 has a rivet or bolt 68 provided with an enlarged head 70 slightly spaced from the side 72 of the lever 50 so that

it is readily received in the slotted connector 74. The slot 76 of connector 74 is keyhole shaped, with the larger slot end 78 being of a size to receive the enlarged head 70 and the linearly-extending smaller part 80 being smaller than the enlarged head 70 but slidably receiving the portion of the rivet or bolt 68 which supports the enlarged head 70 in spaced relation to the side 72 of the lever 50. Then tension of spring 56 acts to keep the rivet or bolt 68 in the end of the slot smaller part 80 opposite the larger slot end 78. However, lever 50 may be manually moved counterclockwise, as viewed in FIGURES 1-3, against the tension force of spring 56 so as to move the rivet or bolt 68 into the larger slot end 78, and then move the connector 74 laterally away from the arm side 72 to disconnect the rivet or bolt 68 and the arm end 66 from the connector 74.

A push rod or plunger 82 is reciprocally received in a swivel tube 84 which supports and guides the rod or plunger as lever 50 is moved arcuately about its pivot axis 54. Swivel tube 84 is mounted to a flange 86 of mounting bracket 28 by means of fitting 88 so that it may move with a relatively small swivel movement, yet sufficiently to accommodate the arcuate movements of arm end 66 without binding the rod or plunger 82. By way of example, the end of the swivel tube contained within the fitting 88 and the portion of that fitting receiving that swivel tube end may have a ball and socket arrangement. Alternatively, the swivel tube may be made of stiff yet somewhat flexible tubing which can flex slightly to accommodate the slight arcuate

movements of the release lever causing the axis of the rod or plunger to be moved in a pivotal manner.

Fitting 88 has one end the sheath 90 of a push-pull cable assembly 92 secured to it so that the one end of sheath 90 is also effectively secured to mounting bracket 28. Cable assembly 92 has a strand or cable 94 received therein with one end either attached to or in abutting relation with rod or plunger 82 so that, when the strand or cable is moved longitudinally within the sheath by being pushed on its other end, it moves rod or plunger 82 rightwardly as seen in FIGURES 1-3 from its position shown in FIGURES 1 and 2 to the position shown in FIGURE 3. This rightward movement of rod or plunger 82 is obtained only in response to a longitudinally compressive force exerted on the other end of the strand or cable, pushing the strand or cable as will be later described. Such movement will move the end 66 of lever 50 rightwardly in an arc about axis 52 against the tension force exerted on lever 50 by spring 56. This longitudinally compressive force is imposed on strand or cable 94 by either of the structures shown respectively in FIGURES 4-7 and FIGURES 7-9. As will be later described this strand or cable compressive-force-induced movement of lever 50 will move the latching mechanism from the locked position to the released position.

However, if a tension force is exerted on the strand or cable 94 in some manner such as pulling generally laterally on an intermediate part of the cable assembly 92, no such releasing movement of lever 50 will occur. Even with the construction wherein the rod or plunger 82 is tightly secured

to the adjacent cable or strand end, tension will at most simply be permitted by the lost-motion action of the slotted connector 74 and the bolt or rivet 68, with no releasing effect on the bolt release lever 50. This provides a theft-deterrent arrangement which prevents a potential thief from reaching in under the hood by hand or the use of a hooked tool and pulling laterally on the cable assembly until the tension so placed on the strand or cable will cause the latching mechanism to be released, as is possible in the typical cable or strand tension-releasing hood latch mechanisms that have been in common use for many years.

As seen in FIGURES 1-3, the striker 12 is moved downwardly from the position shown in FIGURE 1 in order to close the hood 14 and lock it in its closed position. The outer (lower) surface 22 of the striker 12 engages the side surface 34 of arm 26, and acts on that surface as a cam driver, forcing arm 26 to rotate clockwise in the direction of arrow 96 against the tension force of spring 38 and moving the bolt 20 over the inner (upper) surface 18 of the striker 12 and holding the striker in the position shown in FIGURE 2.

FIGURE 2 shows the position of the various elements of the latch mechanism 10 once the hood 14 is closed and the striker 12 is locked in position to retain the hood against opening. The arm 26 has been rotated in the direction of arrow 96 until the notch 98 of side surface 34 has moved past the abutment 100 of the lever 50 and is engaged in locking relation with the surface 102 on the under side of abutment 100.

In the process of this movement of arm 26, the outer side surface 104 of arm 34 acts in camming relation against the side surface 106 of lever 50, causing that lever to be moved arcuately in a counter-clockwise direction sufficiently to permit the abutment 108, formed by the juncture of the upper end of arm 26 side surface 104 and the notch 98, to pass underneath the abutment 100 of lever 50. This counter-clockwise movement of the lever end 66 and the rivet or bolt 68 is permitted by the lost motion action accommodated by the slidable movement of the rivet or bolt 68 within the smaller part 80 of the connector slot 76 without causing any longitudinal movement of the push rod or plunger 82 or the cable or strand 94.

Once the abutment 108 has passed under the abutment 100, the tension in spring 56 moves the lever 50 in a clock-wise direction, positioning the abutment 100 further over the abutment 108 so that the notch 98 is in a position wherein the abutment 100 of lever 50 is received in the notch 98 in locking relation, preventing movement of the arm 26 in a counter-clockwise position. The hood latch mechanism 10 is then in the fully locked position shown in FIGURE 2.

To release the latch mechanism 10, the vehicle operator pushes on the strand or cable 94 by actuating the hood latch and release control 110 schematically shown in FIGURE 1. Either of the two particular arrangements shown in FIGURES 4-6 and 7-9 may be used as the hood latch and release control 110. This pushing action results in movement of the strand or cable 94 within the sheath 90 and a longitudinally compressive force being transmitted through the strand or

cable which moves the rod or plunger 82 rightwardly as seen in FIGURE 3, moving the lever 50 in a counter-clockwise direction against the tension force of spring 56 until abutment 100 is moved to permit abutment 108 be no longer be engaged with the under side 102, thus unlocking the lever 50 from the arm 26. The tension force of spring 38 immediately moves arm 26 in a counter-clockwise direction, opposite to the direction shown by arrow 96 of FIGURES 1 and 2 and in the direction of arrow 112 shown in FIGURE 3, returning the arm 26 and its bolt 20 to the released position.

FIGURE 3 shows the released position of lever 50 after release of the striker 12 has occurred, and before the compressive force exerted on the strand or cable 94 has been released. When the application of that compressive force has ceased, and there is no pushing action by hood latch and release control 110 on the strand or cable, spring 56 returns the lever 50 to the position shown in FIGURE 1, and the mechanism is once again in the ready-to-latch condition. The force of spring 56 will be transmitted through lever 50 and rivet or bolt 68 as a compressive longitudinally-applied force acting rod or plunger 66 and strand 94 to provide a return force to the hood latch and release control 110 so that it is also in position to be pushed and release the latch mechanism once again after that mechanism has again been locked. This return force exerted by spring 56 and transmitted through rod or plunger 66 and strand 94 is preferably augmented by the torsional force of either a torsional spring shown in FIGURE 5a or a compression coil

spring shown in FIGURES 7-9. Those springs are described in detail below.

FIGURE 3a schematically represents the relationship between the vehicle 120 shown in dashed lines, the vehicle hood 14 and the hood striker 12, the hood latch and release mechanism 10, and the hood latch and release control 110. It schematically shows the cable assembly 92 with its sheath 90 and the strand or cable 94 connected to both the mechanism 10 and the control 110.

Referring now to FIGURES 4-6, a handle latch and release control mechanism 200 is shown for activating the hood release mechanism of FIGURES 1-3. The mechanism 200 is one form of the handle latch and release control 110 of FIGURES 1, 3 and 3a. A handle 202 has a section 204 arranged to be grasped by the hand of a vehicle operator, a pivot connection 206 to a push rod 208, and, at a location intermediate section 206 and pivot connection 208, a pivot connection 210 pivotally securing the handle to a fixed part 212 of the vehicle 120 in which the mechanism is installed. Handle 202 should be in such a position relative to the vehicle operator that it is easily reached, grasped and moved as progressively shown in FIGURES 4 and 5 to activate the hood release mechanism, as well as to be pivotally moved about pivot connection 210 to the position shown in FIGURE 6. At the same time, it should be so located that it does not interfere with the normal operations of the vehicle 120 by the vehicle operator.

A support and guide member 214 is fixedly secured to the part 216 of the vehicle fixed part 212. It is generally

tubular, and has a tapered tubular body 218 with the larger end 220 being the part of the body which is secured to the vehicle fixed part 212, 216. A tapered annular shoulder 222 joins the tubular body 218 with the smaller end 224 of support and guide member 214. A tubular guide member 226 is fitted within the tapered tubular body 218. Member 226 has one open end 228 positioned within the larger end 220. Its other open end 230 is formed as an annular ball section 232 which fits within the shoulder 222 in a ball-and-socket relation. This permits the guide member 226 to be moved pivotally in a swivel-like manner within the tapered tubular body 218 as will be further described.

The sheath 90 of push-pull cable assembly 92 has its end 234 opposite the end thereof secured to fitting 88 received within the smaller end 224 of tubular support and guide member 214. The flexible cable or strand 94 of assembly 92 has its end 236 secured to the end 238 of rod 208 by a suitable manner such as the plug or button 240 fitting within rod end 236. When desired, instead of the plug or button, the rod 208 may be crimped so as to grip the end 236 of the cable or strand 94.

When the mechanism 200 is in the latched position shown in FIGURE 4, handle 202 is positioned substantially parallel to the portion of vehicle body 212 on which it is pivoted at 210. The plug or button 240 and the flexible cable or strand end 236 are positioned in the immediate vicinity of the tubular body end 220. The mechanism 10 of FIGURES 1-3 is positioned in fully latched or locked position as shown in FIGURE 2.

In order to actuate the mechanism 10 to release the hood striker 12, the vehicle grasps the handle part 204 and moves it to the position shown in FIGURE 5, this movement being a pivotal movement about pivot 206. This exerts a longitudinally compressive force through the cable or strand 94, via pivot 206, rod 208 and plug or button 240, moving the mechanism 10 to the position shown in FIGURE 1, removing the bolt 20 from its position holding striker 12 in the hood-closed position and allowing the striker to move upwardly from the position shown in FIGURE 2 to the position shown in FIGURE 1. Further movement of the handle part 204 to the full travel position shown in FIGURE 6 moves the mechanism 10 to the position shown in FIGURE 3. Upon the release of the handle part 204 by the vehicle operator, the tension force being exerted by spring 38 on the bolt release lever 50 moves the rivet or bolt 68 leftwardly in an arc from the position shown in FIGURE 3 to the position shown in FIGURE 1. This exerts a longitudinally compressive force through cable or strand 94 back to plug or button 240 and rod 208, moving the handle 202 back to the position shown in FIGURE 4. The mechanism 10 is then in the position shown in FIGURE 1, and the entire mechanism is again ready to latch the hood striker 12 in its downward position of FIGURE 2 when the hood is closed, moving that striker downwardly as earlier described. It is to be understood that if the handle 202 is not moved past the position shown in FIGURE 5 before it is released, it will be returned to the position shown in FIGURE 4.

FIGURE 5a is a somewhat schematic fragmentary cross section view of the pivot connection 210 of the mechanism of

FIGURES 4, 5 and 6, showing the torsion spring 250 which exerts a return force on the handle 202. As earlier noted, this spring, in conjunction with spring 56 of FIGURES 1-3, exerts a return force on the handle 202 so that, when the handle is released by the vehicle operator, the handle returns to the position shown in FIGURE 4. Torsion spring 250 is wound about the pivot bar 252 which is a part of pivot connection 210. The fixed part 212 of the vehicle 120 is schematically shown as having a flange section 254, and the handle 202 has a mounting ear 256 through which the pivot bar 252 extends, permitting the ear 256 to rotate in arcuate directions about the pivot bar as illustrated in FIGURES 4-6. Ear 256 has a notch 258 receiving a hooked end 260 of torsion spring 250. The other end 262 of torsion spring 250 is in engagement with flange section 254, and is prevented by that flange section from moving to unwind the torsion spring from that end. The winding and the installed spring tension of spring 250 is such that spring end 260 is urged clockwise and spring end 262 is urged counterclockwise as respectively indicated by arrows 264 and 266. Since flange section 254 does not permit such movement of spring end 262, any spring end movement caused by the spring tension in spring 250 will move spring end 260 in the direction indicated by arrow 264 when the handle 202 is released from either its positions shown in FIGURE 5 and FIGURE 6, moving the mounting ear 256 pivotally about the pivot bar 252 in the direction of arrow 264, causing the handle 202 to move clockwise as seen in FIGURES 8 and 9 and return to the position shown in FIGURE 7.

The mechanism 300 shown in FIGURES 7, 8 and 9 is another modification of the hood latch and release control 110. It is illustrated in the same positions as respectively shown in FIGURES 4, 5 and 6. Essentially, the pivoting handle 202 is replaced by a handle 302 fixed to the rod 308, with the rod being movable inwardly and outwardly from and between the positions shown in FIGURE 7 to FIGURE 8, FIGURE 8 to FIGURE 9, and FIGURE 9 to FIGURE 7. If the handle 302 is not moved past the position shown in FIGURE 8 before it is released, it will be returned to the position shown in FIGURE 7 by either or both of the forces of tensions spring 56 and the coil spring .

Handle 302 should be in such a position relative to the vehicle operator that it is easily reached, grasped and moved as progressively shown in FIGURES 7 and 8 to activate the hood release mechanism, as well as to be moved to the position shown in FIGURE 9. At the same time, it should be so located that it does not interfere with the normal operations of the vehicle by the vehicle operator.

A support and guide member 314 is fixedly secured to the vehicle fixed part 312 by rivets or bolts 313 or suitable other fastening means. It is generally tubular, having a tubular body 318 with one open end 316 and another open end 320. It has mounting flanges 315 through which the rivets or bolts 313 extend. If mounted by spot welding, for example, the welds would be between flanges 315 and the vehicle fixed part 312. An annular shoulder 322 formed within the tubular body 318 separates the tubular body into a larger diameter part 319 and a smaller diameter part 321. Another shoulder

323 near the open end 316 of tubular body 318 separates the smaller diameter part 321 and a slightly larger diameter part 325. The larger diameter part 325 is located near the open end 316 of tubular body 318. Tubular body parts 319 and 321
5 and the shoulder 322 define a guide cylinder 326. Push rod 308 has a larger diameter part 328 positioned within the tubular body larger diameter part 320 and a smaller diameter part 330 positioned within the tubular body larger diameter part 320. The shoulder 332 joining push rod parts 328 and 330
10 and the shoulder 322 in guide cylinder 326 receive opposite ends of a compression spring 342 which continually urges the two shoulders apart.

The sheath 90 of push-pull cable assembly 92 has its end 334 opposite the end thereof received within the slightly
15 larger diameter tubular body part 325 of tubular support and guide member 314. The flexible cable or strand 94 of assembly 92 has its end 336 secured to the end 338 of rod 308 by a suitable manner such as crimping the rod to the end 336 or using a plug or button as earlier described for FIGURES 3-6.
20 Thus, when the vehicle operator pushes on handle 302, rod 308 is moved inwardly, compressing spring 342 and exerting a longitudinally compressive force on cable or strand 94, moving that cable or strand axially, as indicated by arrow 344, toward the mechanism 10 to which it is connected as seen
25 in FIGURES 1-3.

In order to actuate the mechanism 10 to release the hood striker 12 with the mechanism 300 of FIGURES 7, 8 AND 9, the vehicle operator grasps the handle part 302 with in the position shown in FIGURE 7 and pushes it to the position

shown in FIGURE 8, this movement being a linear sliding movement toward tubular body open end 316. This exerts a longitudinally compressive force through the cable or strand 94, via push rod 308 and its connection with the cable or strand end 94, so that the compressive force being exerted by the vehicle operator moves the mechanism 10 to the position shown in FIGURE 1, removing the bolt 20 from its position holding striker 12 in the hood-closed position and allowing the striker to move upwardly from the position shown in FIGURE 2 to the position shown in FIGURE 1. Further compressive movement of the handle 302 to the full travel position shown in FIGURE 9 moves the mechanism 10 to the position shown in FIGURE 3.

Upon the release of the handle 302 by the vehicle operator, whether it is in the position shown in FIGURE 2 or the position shown in FIGURE 3, the tension force being exerted by spring 38 on the bolt release lever 50 moves the rivet or bolt 68 leftwardly in an arc from the position shown in FIGURE 2 or 3 to the position shown in FIGURE 1. This exerts a longitudinally compressive force through cable or strand 94 back to plug or button 240 and rod 208, moving the handle 302 back to the position shown in FIGURE 7. At the same time, compression spring 342 is exerting a similar force which also urges the handle 302 back to the position shown in FIGURE 7. The mechanism 10 is then in the position shown in FIGURE 1, and the entire mechanism is again ready to latch the hood striker 12 in its downward position of FIGURE 2 when the hood is closed, moving that striker downwardly as earlier described. It is to be understood that if the handle 302 is

not moved past the position shown in FIGURE 8 before it is released, it will be returned to the released/ready to latch position shown in FIGURE 7.

I claim:

1. A vehicle hood latching and releasing and control mechanism for latching and releasing a vehicle hood, said mechanism having one position wherein the hood is latched in a hood closed position and another position wherein the hood is released from being latched, the improvement wherein:

said mechanism includes means responsive only to a longitudinally compressive force being selectively exerted thereon to release the hood from the hood latching condition; and control means for selectively applying such longitudinally compressive force to said mechanism.

2. The vehicle hood latching and releasing and control mechanism for latching and releasing a vehicle hood as set forth in Claim 1 wherein said means responsive only to a longitudinally compressive force being selectively exerted thereon to release the hood from the hood latching condition comprises:

a mounting bracket adapted to be secured to a fixed part of the vehicle of which the vehicle hood is a part;

a hood latching and releasing mechanism having a housing mounted on said bracket with said hood latching and releasing mechanism in position to receive the hood striker as the hood is closed and to latch the hood striker and therefore the hood in the hood closed position, and to release the hood striker; and a control for positioning said hood latching and releasing mechanism in a released position ready for latching the hood striker and, with the hood striker latched by said hood latching and releasing mechanism, to release said hood

latching and releasing mechanism from the hood striker and therefore releasing the vehicle hood;

20 said hood latching and releasing mechanism including:
a latch bolt pivotally mounted on said housing for arcuate movements between a hood striker unlatched position and a hood striker latched position;

a first spring continually urging said latch bolt toward
25 its hood striker unlatched position;

a bolt locking and release lever pivotally mounted on said housing for arcuate movements between a first arcuate position wherein said bolt locking and release lever engages said latch bolt with said latch bolt in its hood striker
30 unlatched position and a second arcuate position wherein said lever is engaged by said latch bolt and locks said latch bolt in its hood striker latched position and beyond said second arcuate position to a third arcuate position wherein said bolt locking and release lever is disengaged from said latch
35 bolt;

a second spring continually urging said bolt locking and releasing lever toward said first position;

and a lost-motion connector connected to said bolt locking and releasing lever;

40 said control means being operatively connected to said lost-motion connector for selectively applying such longitudinally compressive force to said bolt locking and release lever.

3. The vehicle hood latching and releasing and control mechanism for latching and releasing a vehicle hood as set forth in Claim 1 wherein said mechanism includes:

5 a housing adapted to be secured to a fixed part of the vehicle of which the vehicle hood is a part;

a spring-loaded latch bolt pivotally mounted on said housing and adapted to be latched to a hood striker and to be unlatched therefrom and being spring biased to be unlatched from the hood striker;

10 a spring-biased latch bolt locking and release lever pivotally mounted on said housing for arcuate movements between

a first arcuate position wherein said bolt locking and release lever engages said latch bolt with said latch bolt in its hood striker unlatched position

and a second arcuate position wherein said lever is engaged by said latch bolt and locks said latch bolt in its hood striker latched position

20 and beyond said second arcuate position to a third arcuate position wherein said bolt locking and release lever is disengaged from said latch bolt;

a lost-motion connector connected to said bolt locking and releasing lever;
and control means comprises:

25 a cable assembly having a sheath and a cable strand received in said sheath for longitudinal movements therein, said cable sheath having first and second ends, said first end being operatively secured to said housing and said cable strand having first and second ends, said first end being
30 connected to said lost-motion connector with said lost-motion connector providing a lost-motion connection between said

cable strand one end and said bolt locking and releasing lever;

35 a control handle actuatable to operatively move said bolt locking and release lever from said second position to said third position against the force of said second spring action thereon so that said latch bolt is released from locking engagement with said bolt locking and release lever;

40 said cable assembly sheath having its second end operatively secured to a fixed part of the vehicle adjacent to said control handle and said cable strand having its second end operatively secured to said control handle;

45 said control handle acting only to exert compressive longitudinal force on said cable strand to said bolt locking and release lever when moved from said lever second position to said lever third position and only to receive compressive longitudinal force from said bolt locking and release lever through said cable strand when that lever is moved by said second spring from one of said second and third lever positions to said first lever position.
50

4. The vehicle hood latching and releasing and control mechanism, for latching and releasing a vehicle hood as set forth in Claim 2 wherein said control means comprises:

5 a cable assembly having a sheath and a cable strand received in said sheath for longitudinal movements therein, said cable sheath having first and second ends, said first end being operatively secured to said housing and said cable strand having first and second ends, said first end being
10 connected to said lost-motion connector with said lost-motion

connector providing a lost-motion connection between said cable strand one end and said bolt locking and releasing lever;

15 a control handle actuatable to operatively move said bolt locking and release lever from said second position to said third position against the force of said second spring action thereon so that said latch bolt is released from locking engagement with said bolt locking and release lever;

20 said cable assembly sheath having its second end operatively secured to a fixed part of the vehicle adjacent to said control handle and said cable strand having its second end operatively secured to said control handle;

25 said control handle acting only to exert compressive longitudinal force on said cable strand to said bolt locking and release lever when moved from said lever second position to said lever third position and only to receive compressive longitudinal force from said bolt locking and release lever through said cable strand when that lever is moved by said second spring from one of said second and third lever
30 positions to said first lever position.

5 5. For use in a vehicle having a hood for a compartment which is selectively opened and closed in relation to a fixed part of the vehicle, said hood having a striker adapted to be engaged by a latching mechanism to hold the hood closed when the hood is moved from its open condition to its closed condition;

a hood latching and releasing and control mechanism comprising:

10 a mounting bracket adapted to be secured to the fixed part of the vehicle;

15 a hood latching and releasing mechanism having a housing mounted on said bracket with said hood latching and releasing mechanism in position to receive the hood striker as the hood is closed and to latch the hood striker and therefore the hood in the hood closed position, and to release the hood striker; and a control for positioning said hood latching and releasing mechanism in a released position ready for latching the hood striker and, with the hood striker latched by said hood latching and releasing mechanism, to release said hood latching and releasing mechanism from the hood striker and therefore releasing the vehicle hood;

20 said hood latching and releasing mechanism including:
a latch bolt pivotally mounted on said housing for arcuate movements between a hood striker unlatched position and a hood striker latched position;

25 a first spring continually urging said latch bolt toward its hood striker unlatched position;

30 a bolt locking and release lever pivotally mounted on said housing for arcuate movements between a first arcuate position wherein said bolt locking and release lever engages said latch bolt with said latch bolt in its hood striker unlatched position and a second arcuate position wherein said lever is engaged by said latch bolt and locks said latch bolt in its hood striker latched position and beyond said second arcuate position to a third arcuate position wherein said bolt locking and release lever is disengaged from said latch bolt;

a second spring continually urging said bolt locking and releasing lever toward said first position;

40 and a lost-motion connector connected to said bolt locking and releasing lever;
said control including:

 a cable assembly having a sheath and a cable strand received in said sheath for longitudinal movements therein,
45 said cable sheath having first and second ends, said first end being operatively secured to said housing and said cable strand having first and second ends, said first end being connected to said lost-motion connector with said lost-motion connector providing a lost-motion connection between said
50 cable strand one end and said bolt locking and releasing lever;

 a control handle actuatable to operatively move said bolt locking and release lever from said second position to said third position against the force of said second spring
55 action thereon so that said latch bolt is released from locking engagement with said bolt locking and release lever;

 said cable assembly sheath having its second end operatively secured to a fixed part of the vehicle adjacent to said control handle and said cable strand having its
60 second end operatively secured to said control handle;

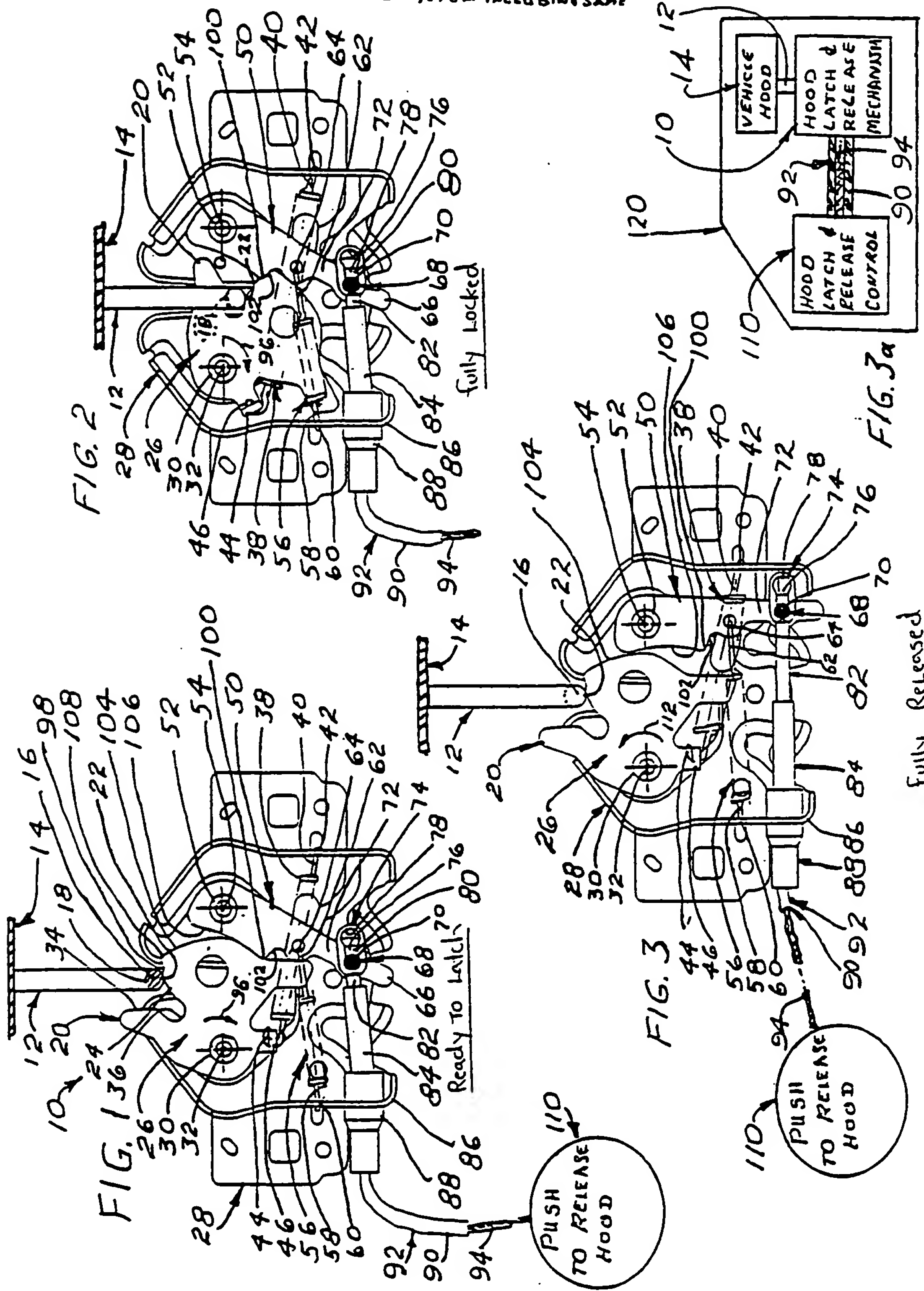
 said control handle acting only to exert compressive longitudinal force on said cable strand to said bolt locking and release lever when moved from said lever second position to said lever third position and only to receive compressive
65 longitudinal force from said bolt locking and release lever through said cable strand when that lever is moved by said

second spring from one of said second and third lever positions to said first lever position.

6. The hood latching and releasing and control mechanism of claim 5 in which said control handle is adapted to be pivotally mounted on a fixed part of the vehicle and pivotally moved from a first pivotal position to a second
5 pivotal position and to a third pivotal position and being operatively connected to said cable strand second end to cause said cable strand to be moved in said sheath by longitudinally compressive force as aforesaid.

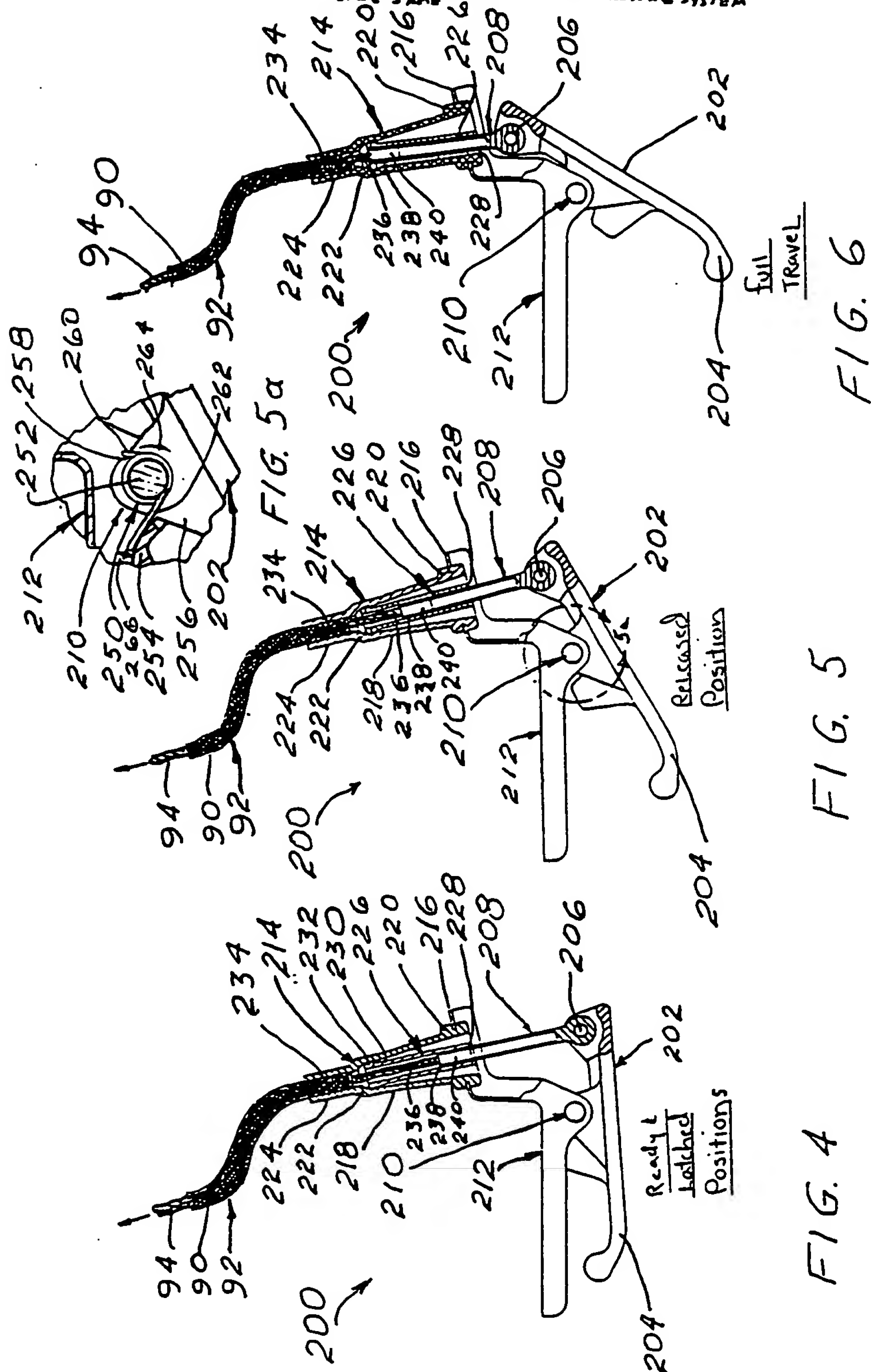
7. The hood latching and releasing and control mechanism of claim 5 in which said control handle is adapted to be mounted on a fixed part of the vehicle so as to be pushed by a vehicle operator for longitudinally linear
5 movement in alignment with said cable strand second end from a first longitudinal position to a second longitudinal position and to a third position and being operatively connected to said cable strand second end to exert longitudinal compressive force on said cable strand and cause
10 said cable strand to be moved in said sheath by longitudinally compressive force as aforesaid.

Sheet 1 of 3, ATTACHED TO DU/097PK
INVENTOR Peter C. Koenig, entitled,
"HOOD LATCH AND RELEASE MECHANISM AND
OPERATING SYSTEM INCLUDING SAME"



2 / 3

SHEET 2 of 3, ATTORNEY Docket # D1097 PK
 Invention of Peter C. Koenig, entitled:
 "A LATCH MECHANISM AND OPERATING SYSTEM
 INCLUDING SAME"



3/3

Sheet 3 of 3, ATT: Docket # 441097
 INVENTOR Peter C. Koenig, et al.
 "HOOD LATCH MECHANISM AND OPERATING
 SYSTEM INCLUDING SAME"

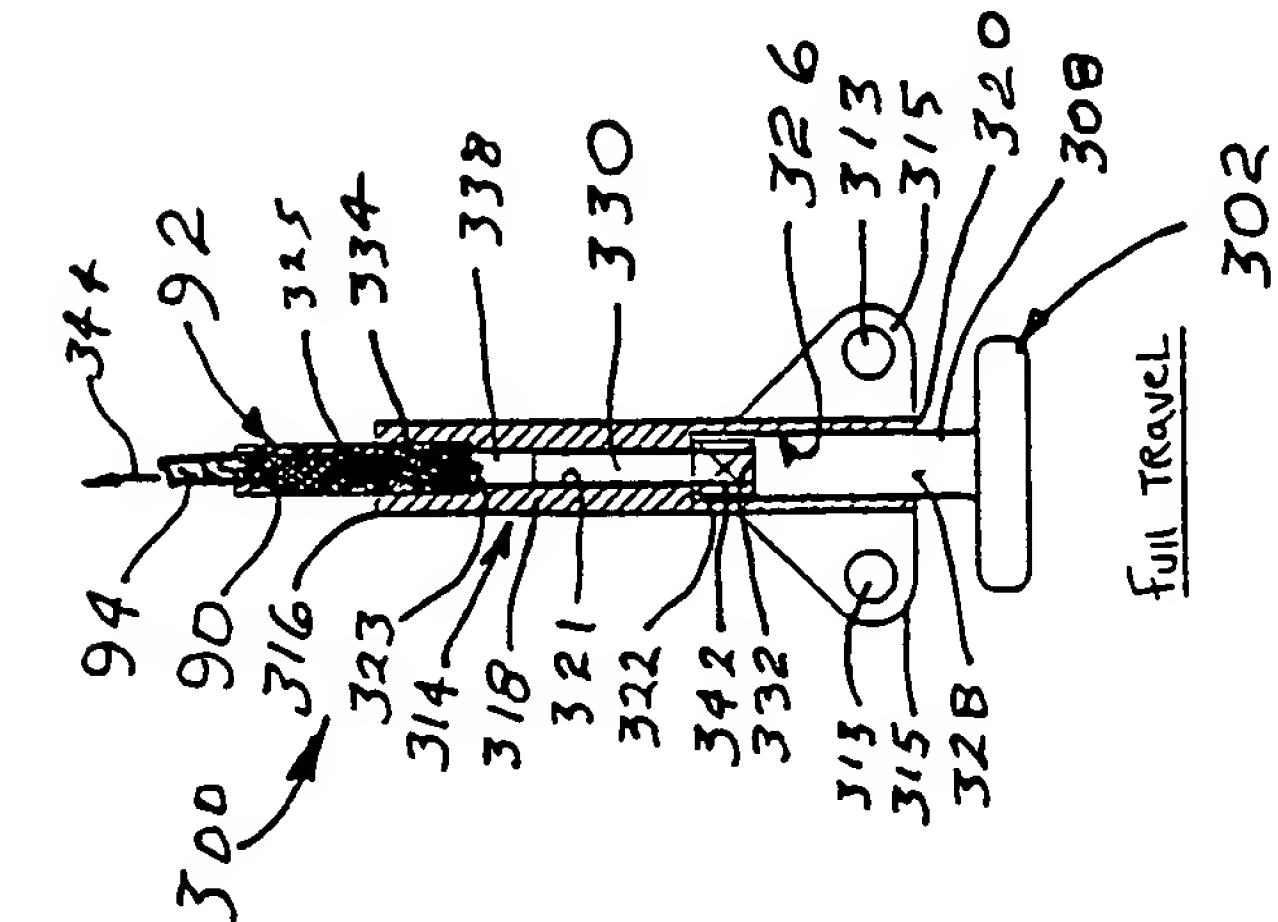


FIG. 9

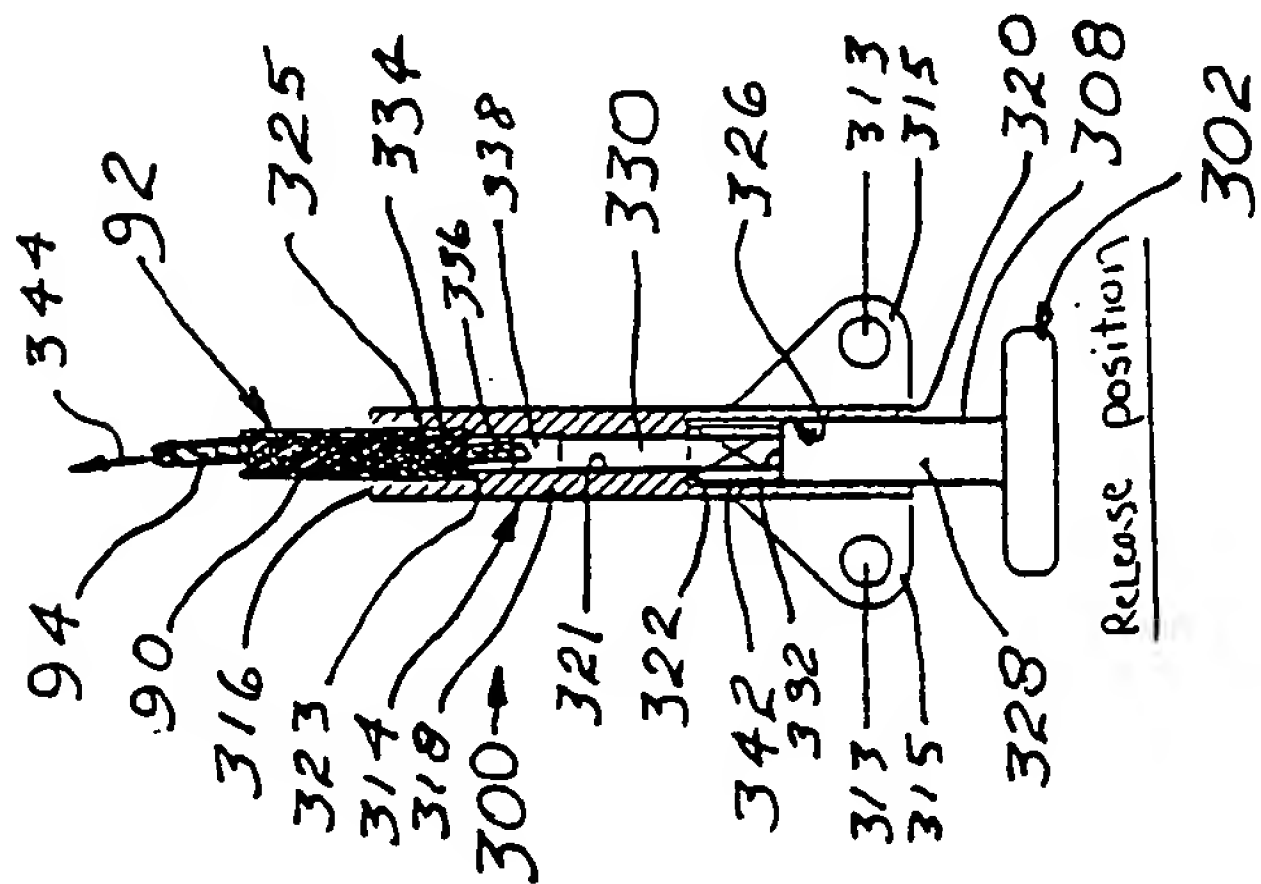


FIG. 8

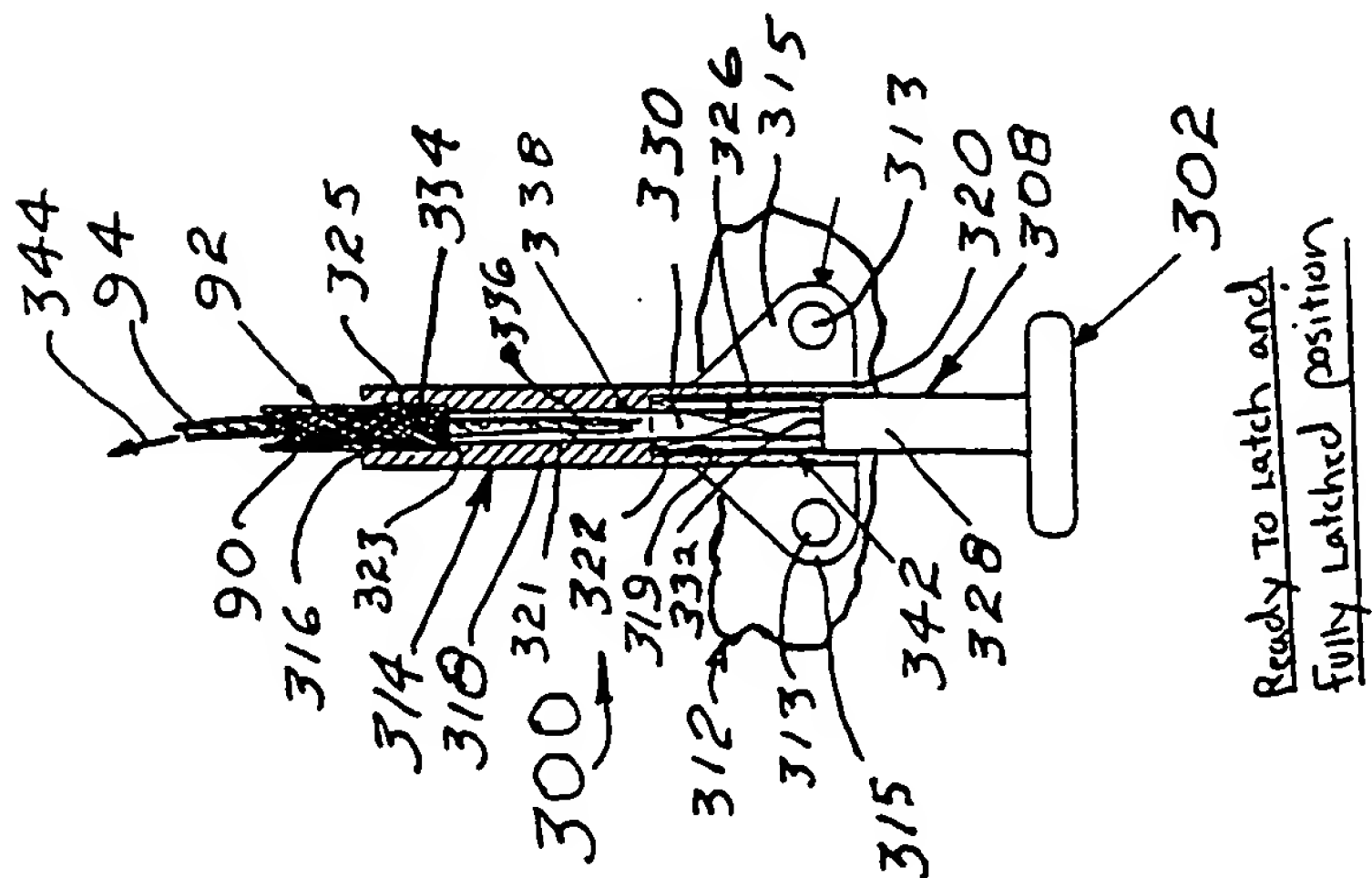


FIG. 7

INTERNATIONAL SEARCH REPORT

Inte onal Application No

PCT/US 98/00319

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E05B65/19

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
IPC 6 E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 3 161 426 A (BILLANCOURT LUCIEN PÉRAS) 15 December 1964 see the whole document ---	1 5,7
X A	US 2 117 339 A (CLAUD-MANTLE ARTHUR) 17 May 1938 see the whole document ---	1 5,6
X A	GB 630 768 A (WILMOT-BREEDEN LIMITED) 10 November 1949 see the whole document ---	1 2
X A	FR 2 102 444 A (RÉGIE NATIONALE DES USINES RENAULT ET AUTOMOBILES PEUGEOT) 7 April 1972 see page 4, line 15 - line 22; claim 1; figure 2 --- -/--	1 3

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search

24 April 1998

Date of mailing of the international search report

13/05/1998

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/00319

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 1 327 087 A (ÉTABLISSEMENTS DEFLEUR) 28 August 1963	1
A	see the whole document ---	7
X	FR 2 531 130 A (REGIE NATIONALE DES USINES RENAULT) 3 February 1984 see page 5, line 12 - page 6, line 4; claim 1; figures 2,3 ---	1
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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